

# PATENT COOPERATION TREATY

**PCT**

## NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

COHEN, Alan, Nicol  
2 Grove Place  
Tatsfield  
Westerham  
Kent TN16 2BB  
ROYAUME-UNI

Date of mailing (day/month/year) 26 September 2000 (26.09.00)	<b>IMPORTANT NOTIFICATION</b>
Applicant's or agent's file reference 279	International filing date (day/month/year) 07 October 1999 (07.10.99)
International application No. PCT/GB99/03318	

1. The following indications appeared on record concerning:
- ☒ the applicant
 ☐ the inventor
 ☐ the agent
 ☐ the common representative

Name and Address

State of Nationality

State of Residence

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person
 ☐ the name
 ☐ the address
 ☐ the nationality
 ☐ the residence

Name and Address

SMART (ISLE OF MAN) LIMITED  
Unicorn Chambers  
45 Victoria Street  
Douglas IM1 2LD  
United Kingdom

State of Nationality  
GB

State of Residence  
GB

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

**The above-mentioned Company is recorded as applicant only for all designated States except US, whereas the applicants/inventors are registered for US only.**

4. A copy of this notification has been sent to:

☒ the receiving Office

☐ the International Searching Authority

☒ the International Preliminary Examining Authority

☐ the designated Offices concerned

☒ the elected Offices concerned

☐ other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No.: (41-22) 740.14.35	Authorized officer  Marie-José Devillard  Telephone No.: (41-22) 338.83.38
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## PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

COHEN, Alan, Nicol  
2 Grove Place  
Tatsfield  
Westerham  
Kent TN16 2BB  
ROYAUME-UNIRECEIVED  
MAY 29 2001  
10 1100 MAIL ROOM

Date of mailing (day/month/year) 09 April 2001 (09.04.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 279	
International application No. PCT/GB99/03318	International filing date (day/month/year) 07 October 1999 (07.10.99)

## 1. The following indications appeared on record concerning:

☒

the applicant

☒

the inventor

☐

the agent

☐

the common representative

## Name and Address

BUCK, Karon, Doreen  
Alancroft  
Kingsfield Road  
West Kingsdown  
Kent TN15 6LH  
United Kingdom

## State of Nationality

GB

## State of Residence

GB

Telephone No.

Facsimile No.

Teleprinter No.

## 2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐

the person

☐

the name

☒

the address

☐

the nationality

☐

the residence

## Name and Address

BUCK, Karon, Doreen  
2 Calais Cottages  
Three Gates Road  
Fawkham  
Kent DA3 8NY  
United Kingdom

## State of Nationality

GB

## State of Residence

GB

Telephone No.

Facsimile No.

Teleprinter No.

## 3. Further observations, if necessary:

## 4. A copy of this notification has been sent to:

☒

the receiving Office

☐

the International Searching Authority

☐

the International Preliminary Examining Authority

☐

the designated Offices concerned

☒

the elected Offices concerned

☐

other:

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

I. Britel

Telephone No.: (41-22) 338.83.38

## PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

COHEN, Alan, Nicol  
2 Grove Place  
Tatsfield  
Westerham  
Kent TN16 2BB  
ROYAUME-UNIDate of mailing (day/month/year)  
25 April 2001 (25.04.01)Applicant's or agent's file reference  
279

## IMPORTANT NOTIFICATION

International application No.  
PCT/GB99/03318International filing date (day/month/year)  
07 October 1999 (07.10.99)

## 1. The following indications appeared on record concerning:

☒ the applicant ☒ the inventor ☐ the agent ☐ the common representative

## Name and Address

NAYLOR, Timothy De Villiers  
Englefield Green  
Surrey TW2 0NQ  
United KingdomState of Nationality  
GBState of Residence  
GB

Telephone No.

Facsimile No.

Teleprinter No.

## 2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☐ the name ☒ the address ☐ the nationality ☐ the residence

## Name and Address

NAYLOR, Timothy De Villiers  
10 Kingswood Close  
Englefield Green  
Egham  
Surrey TW20 0NQ  
United KingdomState of Nationality  
GBState of Residence  
GB

Telephone No.

Facsimile No.

Teleprinter No.

## 3. Further observations, if necessary:

## 4. A copy of this notification has been sent to:

☒ the receiving Office ☐ the designated Offices concerned  
☐ the International Searching Authority ☒ the elected Offices concerned  
☐ the International Preliminary Examining Authority ☐ other:The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Authorized officer

I. Britel

Facsimile No.: (41-22) 740.14.35

Telephone No.: (41-22) 338.83.38

## PATENT COOPERATION TREATY

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NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

COHEN, Alan, Nicol  
2 Grove Place  
Tatsfield  
Westerham  
Kent TN16 2BB  
ROYAUME-UNIRECEIVED  
MAY 29 2001  
IC 1100 MAIL ROOM

Date of mailing (day/month/year) 09 April 2001 (09.04.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 279	
International application No. PCT/GB99/03318	International filing date (day/month/year) 07 October 1999 (07.10.99)

## 1. The following indications appeared on record concerning:

☒

the applicant

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the inventor

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the agent

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the common representative

## Name and Address

NAYLOR, Timothy De Villiers  
Englefield Green  
Surrey TW2 0NQ  
United Kingdom

## State of Nationality

GB

## State of Residence

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## Name and Address

NAYLOR, Timothy De Villiers  
10 Kingswood Close  
Englefield Green  
Egham  
Surrey TW20 0NQ  
United Kingdom

## State of Nationality

GB

## State of Residence

GB

Telephone No.

Facsimile No.

Teleprinter No.

## 3. Further observations, if necessary:

## 4. A copy of this notification has been sent to:

☒

the receiving Office

☐

the International Searching Authority

☐

the International Preliminary Examining Authority

☐

the designated Offices concerned

☒

the elected Offices concerned

☐

other:

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

I. Britel

Telephone No.: (41-22) 338.83.38

## PCT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
 United States Patent and Trademark  
 Office  
 Box PCT  
 Washington, D.C.20231  
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

<b>Date of mailing (day/month/year)</b> 23 May 2000 (23.05.00)	
<b>International application No.</b> PCT/GB99/03318	<b>Applicant's or agent's file reference</b> 279
<b>International filing date (day/month/year)</b> 07 October 1999 (07.10.99)	<b>Priority date (day/month/year)</b> 07 October 1998 (07.10.98)
<b>Applicant</b> BRATTON, Graham, John et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

02 May 2000 (02.05.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No.: (41-22) 740.14.35	Authorized officer  Juan Cruz  Telephone No.: (41-22) 338.83.38
--	---

# PATENT COOPERATION TREATY

From the:  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:  
COHEN, Alan, Nicol  
2 Grove Place  
Tatsfield, Westerham  
Kent TN16 2BB  
GRANDE BRETAGNE

## PCT

### WRITTEN OPINION

(PCT Rule 66)

Date of mailing (day/month/year)		01.08.2000
Applicant's or agent's file reference 279		REPLY DUE within 3 month(s) from the above date of mailing
International application No. PCT/GB99/03318	International filing date (day/month/year) 07/10/1999	Priority date (day/month/year) 07/10/1998
International Patent Classification (IPC) or both national classification and IPC B01D63/06		
Applicant BRATTON, Graham, John et al.		

- This written opinion is the **first** drawn up by this International Preliminary Examining Authority.
- This opinion contains indications relating to the following items:
  - ☒ Basis of the opinion
  - ☐ Priority
  - ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - ☐ Lack of unity of invention
  - ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - ☐ Certain document cited
  - ☒ Certain defects in the international application
  - ☒ Certain observations on the international application
- The applicant is hereby **invited to reply** to this opinion.
 

**When?** See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

**How?** By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

**Also:** For an additional opportunity to submit amendments, see Rule 66.4.  
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.  
For an informal communication with the examiner, see Rule 66.6.

**If no reply is filed,** the international preliminary examination report will be established on the basis of this opinion.
- The final date by which the international preliminary examination report must be established according to Rule 69.2 is: **07/02/2001**.

Name and mailing address of the international preliminary examining authority:



European Patent Office - P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk - Pays Bas  
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl  
Fax: +31 70 340 - 2016

Authorized officer / Examiner

Hoornaert, P

Formalities officer (incl. extension of time limits)

Sinanovic, E

Telephone No. +31 70 340 2672



## WRITTEN OPINION

International application No. PCT/GB99/03318

### I. Basis of the opinion

1. This opinion has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".*):

#### Description, pages:

1-10 as originally filed

#### Claims, No.:

1-15 as originally filed

#### Drawings, sheets:

1/1 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

### V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

#### 1. Statement

Novelty (N)	Claims
Inventive step (IS)	Claims 1-15
Industrial applicability (IA)	Claims

#### 2. Citations and explanations

see separate sheet

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**



**Re Item V**

1. Reference is made to the following documents:

D1: EP 0 659 469 A

D2: WO 93 19840 A

D3: EP 0 686 424 A

D4: US 5 062 910 A

D5: EP 0 481 660 A

D6: WO 97 18886 A

D7: J. GILLOT, "New ceramic media for cross-flow filtration and ultrafiltration",  
Fourth World Filtration Congress, 1986

- 2.1 D1 (see passages as highlighted in the Search Report) discloses a membrane structure comprising a tubular porous monolith having a plurality of tubular conduits (i.e. a multichannel membrane structure) formed within the monolith with a zeolite membrane formed on the internal surface of the conduits. The conduits have an internal diameter of 2 to 12 mm. Ceramic supports are explicitly mentioned and are used in all the examples (as tubular supports).

The membrane structure of D1 is used for separating water from alcohols by pervaporation.

D2 (see passages as highlighted in the Search Report) discloses a membrane structure comprising a tubular porous ceramic monolith having at least four tubular conduits (i.e. a multichannel membrane structure) formed within the monolith with a zeolite membrane formed on the internal surface of the conduits. The conduits have an internal diameter of 4 mm.

The membrane structure of D2 is used for separating water from alcohols.

Each of the documents D1 or D2 can equally be considered as representing the closest prior art,

- 2.2 The membrane structures of D1 and D2 differ only from the subject matter of

claim 1 in that :

-in D1, a different diameter for the monolith and a broader range for the internal diameters of the conduits is given, and the expression "a plurality of" instead of "at least four" is used to define the number of channels, and

-in D2, a slightly different internal diameter for the conduits and a different diameter for the monolith is used.

In this connection, it is pointed out that a broad selection (i.e. selecting "5 to 9 mm" from the range "2 to 12 mm" for the internal diameters of the conduits as mentioned in D1) alone cannot confer novelty to claim 1.

2.3 However, tubular porous ceramic monoliths with internal channels are well-known in the art. They have been developed with different outer diameters and with internal channels differing in number, shape and internal diameter (see e.g. D3, D4 and D7). Ceramic monoliths having an outer diameter within the range as defined in claim 1 and being provided with internal conduits having an internal diameter within the range as defined in claim 1 are described in D3 and D4 (see passages as highlighted in the Search Report). The choice of a specific monolith geometry is always a compromise between surface area per unit length, minimum pressure drop, overall permeability and cost per unit area of membrane (see description, page 2 paragraphs 1 and 2, D3, col. 2 line 1 - col. 3 line 44, and D7, page 1).

2.4 The distinguishing features (see point 2.2 above) are thus merely some of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to obtain a specific result (e.g. performance, permeability, costs).

In this connection, it is further pointed out that D5 (see passages as highlighted in the Search Report) discloses a tubular ceramic membrane with a zeolite membrane formed on its internal surface and having an inner diameter of 6.5 mm. Said membrane is also used for separating water from alcohols by pervaporation.

2.5 Consequently, the subject-matter of independent claim 1 does not involve an inventive step (Art. 33(3) PCT).

3. The additional features of dependent claims 2-14 are known from D1-D3.

The additional features of dependent claim 15 are known from D6.

For these reasons, dependent claims 2-15 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step.

4. It is not at present apparent which part of the application could serve as a basis for a new claim which would satisfy the criteria set forth in Article 33 PCT. Should the applicant nevertheless regard some particular matter as patentable an independent claim including such particular matter should be filed taking account of Rule 6.3 (b) PCT. The applicant should in his letter of reply also indicate on the one hand the difference between the state of the art (D1-D5) and such particular matter in terms of claimed technical features and on the other hand the significance of any such differences in the light of the problem/solution approach.

It is further pointed out that the applicant has provided no technical information to show that any subject matter of the application actually solves a problem associated with the membrane structure of the closest prior art (D1, D2). The only comparative tests are carried out against a single tubular membrane (see page 10). It is clear that additional technical information would be necessary to demonstrate inventivity, e.g. comparative test showing an improved effect with respect to said closest prior art (D1, D2). Moreover, said improved effect should be **unexpected** for the skilled person in the light of the available prior art (in particular D3 and D5, see points 2.3 and 2.4 above).

#### Re Item VII

1. Contrary to the requirements of Rule 5.1 (a)(ii) PCT, the relevant background art disclosed in the documents D1-D5 is not mentioned in the description, nor are these documents identified therein.

2. The applicant will have to bring the description into conformity with newly filed claims; care should be taken during revision, especially of the introductory portion including any statement of problem or advantage, not to add subject-matter which extends beyond the content of the application as originally filed, (Article 34(2)(b) PCT).
3. The applicant is requested to file amendments by way of replacement pages in the manner stipulated by Rule 66.8(a) PCT. In particular, fair copies of the amendments should be filed preferentially in triplicate.

Moreover, the applicant's attention is drawn to the fact that, as a consequence of Rule 66.8(a) PCT the examiner is not permitted to carry out any amendments under the PCT procedure, however minor these may be.

According to PCT Guidelines C-III, 7(4) only typed replacement sheets are allowed.

4. In order to facilitate the examination of the conformity of the amended application with the requirements of Article 34(2)(b) PCT, the applicant is requested to clearly identify the amendments carried out, no matter whether they concern amendments by addition, replacement or deletion, and to indicate the passages of the application as filed on which these amendments are based (see Rule 66.8(a) PCT).

If the applicant regards it as appropriate these indications could be submitted in handwritten form on a copy of the relevant parts of the application as filed.

5. The features of the claims are not provided with reference signs placed in parentheses Rule 6.2 (b) PCT.

#### **Re Item VIII**

It is not clear from claim 1 whether the internal diameter of 5 to 9 mm relates to the zeolite membranes or to the tubular conduits ("... a zeolite membrane formed on the internal surface of the conduits the zeolite membranes having an internal

**WRITTEN OPINION  
SEPARATE SHEET**

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International application No. PCT/GB99/03318

diameter .."). According to the description (see example), it appears that the internal diameter relates to the conduits (i.e. before coating).

# PATENT COOPERATION TREATY

170

From the INTERNATIONAL SEARCHING AUTHORITY

## PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT  
OR THE DECLARATION

(PCT Rule 44.1)

To:

COHEN, Alan, Nicol  
2 Grove Place  
Tatsfield, Westerham  
Kent TN16 2BB  
UNITED KINGDOM

Date of mailing  
(day/month/year)

09/03/2000

Applicant's or agent's file reference  
279

**FOR FURTHER ACTION** See paragraphs 1 and 4 below

International application No.  
PCT/GB 99/ 03318

International filing date  
(day/month/year) 07/10/1999

Applicant

BRATTON, Graham, John et al.

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

**Filing of amendments and statement under Article 19:**

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

**When?** The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

**Where?** Directly to the International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland  
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax (+31-70) 340-2016

Authorized officer

Trudy Thoen-de Jong

## NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

### INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

#### What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

#### When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

#### Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

#### How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

**The amendments must be made in the language in which the international application is to be published.**

#### What documents must/may accompany the amendments?

##### Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

**The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.**

## NOTES TO FORM PCT/ISA/220 (continu

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

**The following examples illustrate the manner in which amendments must be explained in the accompanying letter:**

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:  
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:  
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:  
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or  
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:  
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

### **"Statement under article 19(1)" (Rule 46.4)**

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

**It must be in the language in which the international application is to be published.**

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

### **Consequence if a demand for international preliminary examination has already been filed**

If, at the time of filing any amendments and any accompanying statement, under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the time of filing the amendments (and any statement) with the International Bureau, also file with the International Preliminary Examining Authority a copy of such amendments (and of any statement) and, where required, a translation of such amendments for the procedure before that Authority (see Rules 55.3(a) and 62.2, first sentence). For further information, see the Notes to the demand form (PCT/PEA/401).

### **Consequence with regard to translation of the international application for entry into the national phase**

The applicant's attention is drawn to the fact that, upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.



# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>279</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/GB 99/ 03318</b>	International filing date ( <i>day/month/year</i> ) <b>07/10/1999</b>	(Earliest) Priority Date ( <i>day/month/year</i> ) <b>07/10/1998</b>
Applicant  <b>BRATTON, Graham, John et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☒ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1  
☐ None of the figures.

# INTERNATIONAL SEARCH REPORT

International application No.

CT/GB 99/ 03318

Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

The abstract is modified as follows :

Line 2 : after "support" insert "(1)" ;  
after "conduits" insert "(2)" ;

Line 3 : after "conduits" insert "(2)" ;  
Line 4 : after "support" insert "(1)".

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/03318

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 B01D63/06 B01J1/02 B01J37/02 B01J35/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B01D B01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 659 469 A (MITSUI SHIPBUILDING ENG) 28 June 1995 (1995-06-28) abstract; claims page 2, line 51 -page 3, line 31 example 1	1,4,6-10
Y	WO 93 19840 A (BRITISH PETROLEUM CO PLC ;BRATTON GRAHAM JOHN (GB); NAYLOR TIMOTHY) 14 October 1993 (1993-10-14) abstract; claims 1,6 page 7, line 27 -page 8, line 24 page 12, line 9 - line 26 example 1	1-14
A	---	15
	--- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*Z\* document member of the same patent family

Date of the actual completion of the international search

23 February 2000

Date of mailing of the international search report

09.03.00

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
 Fax: (+31-70) 340-3016

Authorized officer

Hoornaert, P

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/03318

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 686 424 A (TAMI IND) 13 December 1995 (1995-12-13) abstract; figures 1,3 column 5, line 37 - line 48 column 9, line 4 - line 36 ---	1-14
A	US 5 062 910 A (GARCERA DANIEL ET AL) 5 November 1991 (1991-11-05) abstract; figures 1-4 column 7, line 11 - line 18 ---	1-7
A	EP 0 481 660 A (BRITISH PETROLEUM CO PLC) 22 April 1992 (1992-04-22) abstract; examples 8,12 ---	1
A	WO 97 18886 A (BRATTON GRAHAM JOHN ;BUCK KARON DOREEN (GB); NAYLOR TIMOTHY DE VIL) 29 May 1997 (1997-05-29) abstract; claims; figure page 2, line 16 -page 3, paragraph 3 examples 1,2,5 ---	1,8-11, 13-15
A	GILLOT J ET AL: "NEW CERAMIC FILTER MEDIA FOR CROSS-FLOW MICROFILTRATION AND ULTRAFILTRATION" WORLD FILTRATION CONGRESS. PROCEEDINGS,XX,XX, 1 January 1986 (1986-01-01), pages 613-620, XP000614839 the whole document -----	1,2,4,6, 7

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/03318

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0659469	A	28-06-1995	JP 7185275 A	25-07-1995
			US 5554286 A	10-09-1996
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WO 9319840	A	14-10-1993	AU 663181 B	28-09-1995
			AU 3894493 A	08-11-1993
			EP 0632743 A	11-01-1995
			JP 7505331 T	15-06-1995
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EP 0686424	A	13-12-1995	FR 2720953 A	15-12-1995
			CA 2151186 A	09-12-1995
			FR 2720954 A	15-12-1995
			US 5607586 A	04-03-1997
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US 5062910	A	05-11-1991	FR 2642328 A	03-08-1990
			CA 2008631 A,C	27-07-1990
			DE 69019552 D	29-06-1995
			DE 69019552 T	21-09-1995
			EP 0385089 A	05-09-1990
			ES 2072927 T	01-08-1995
			JP 2237622 A	20-09-1990
			KR 140386 B	01-06-1998
			NO 176205 B	14-11-1994
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EP 0481660	A	22-04-1992	AT 154895 T	15-07-1997
			AU 8473991 A	30-04-1992
			CA 2052289 A	20-04-1992
			DE 69126692 D	07-08-1997
			DE 69126692 T	23-10-1997
			ES 2102997 T	16-08-1997
			JP 5043218 A	23-02-1993
			NZ 239958 A	25-09-1992
			US 5362522 A	08-11-1994
			US 5567664 A	22-10-1996
			US 5605631 A	25-02-1997
			ZA 9107712 A	26-03-1993
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WO 9718886	A	29-05-1997	AU 713866 B	09-12-1999
			AU 7631896 A	11-06-1997
			CA 2237436 A	29-05-1997
			CN 1202839 A	23-12-1998
			EP 0863791 A	16-09-1998
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# PATENT COOPERATION TREATY

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From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
COHEN, Alan, Nicol 2 Grove Place Tatsfield, Westerham Kent TN16 2BB GRANDE BRETAGNE

## PCT

### NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Rule 71.1)

Date of mailing (day/month/year) 22.01.2001	
Applicant's or agent's file reference 279	<b>IMPORTANT NOTIFICATION</b>
International application No. PCT/GB99/03318	International filing date (day/month/year) 07/10/1999
Priority date (day/month/year) 07/10/1998	
Applicant BRATTON, Graham, John et al.	

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

#### 4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. 31 (0) 78 639 3910 Telex 31 651 5000	Authorized officer  Sinanovic, E	
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# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>279</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/GB99/03318</b>	International filing date (day/month/year) <b>07/10/1999</b>	Priority date (day/month/year) <b>07/10/1998</b>
International Patent Classification (IPC) or national classification and IPC <b>B01D63/06</b>		
Applicant <b>BRATTON, Graham, John et al.</b>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of    sheets.

3. This report contains indications relating to the following items:

- I    ☒ Basis of the report
- II   ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V   ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand  <b>02/05/2000</b>	Date of completion of this report  <b>22.01.2001</b>
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl	Authorized officer  <b>Hoornaert, P</b>



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB99/03318

**I. Basis of the report**

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

**Description, pages:**

1-10 as originally filed.

**Claims, No.:**

1-15 as originally filed

**Drawings, sheets:**

1/1 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB99/03318

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**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims	1-15
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-15
Industrial applicability (IA)	Yes:	Claims	1-15
	No:	Claims	

**2. Citations and explanations**

**see separate sheet**

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/GB99/03318

**Re Item V**

**1. Reference is made to the following documents:**

D1: EP 0 659 469 A

D2: WO 93 19840 A

D3: EP 0 686 424 A

D4: US 5.062 910 A

D5: EP 0 481 660 A

D6: WO 97 18886 A

D7: J. GILLOT, "New ceramic media for cross-flow filtration and ultrafiltration",  
Fourth World Filtration Congress, 1986

- 2.1 D1 (see passages as highlighted in the Search Report) discloses a membrane structure comprising a tubular porous monolith having a plurality of tubular conduits (i.e. a multichannel membrane structure) formed within the monolith with a zeolite membrane formed on the internal surface of the conduits. The conduits have an internal diameter of 2 to 12 mm. Ceramic supports are explicitly mentioned and are used in all the examples (as tubular supports).

The membrane structure of D1 is used for separating water from alcohols by pervaporation.

D2 (see passages as highlighted in the Search Report) discloses a membrane structure comprising a tubular porous ceramic monolith having at least four tubular conduits (i.e. a multichannel membrane structure) formed within the monolith with a zeolite membrane formed on the internal surface of the conduits. The conduits have an internal diameter of 4 mm.

The membrane structure of D2 is used for separating water from alcohols.

Each of the documents D1 or D2 can equally be considered as representing the closest prior art.

- 2.2 The membrane structures of D1 and D2 differ only from the subject matter of

claim 1 in that :

-in D1, a different diameter for the monolith and a broader range for the internal diameters of the conduits is given, and the expression "a plurality of" instead of "at least four" is used to define the number of channels, and

-in D2, a slightly different internal diameter for the conduits and a different diameter for the monolith is used.

In this connection, it is pointed out that a broad selection (i.e. selecting "5 to 9 mm" from the range "2 to 12 mm" for the internal diameters of the conduits as mentioned in D1) alone cannot confer novelty to claim 1.

- 2.3 However, tubular porous ceramic monoliths having at least four tubular conduits are well-known in the art. They have been developed with various outer diameters and with internal channels differing in number, shape and internal diameter (see e.g. D3, D4 and D7). Ceramic monoliths having an outer diameter within the range as defined in claim 1 and also being provided with internal conduits having an internal diameter within the range as defined in claim 1 are e.g. described in D3 and D4 (see passages as highlighted in the Search Report).

The choice of a specific monolith geometry is always a compromise between surface area per unit length, minimum pressure drop, overall permeability and cost per unit area of membrane (see description, page 2 paragraphs 1 and 2; D3, col. 2 line 1 - col. 3 line 44; and D7, page 1).

- 2.4 The distinguishing features (see point 2.2 above) are thus merely some of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to obtain a specific result (e.g. performance, permeability, costs).

In this connection, it is further pointed out that D5 (see passages as highlighted in the Search Report) discloses a tubular ceramic membrane with a zeolite membrane formed on its internal surface and having an inner diameter of 6.5 mm. Said membrane is also used for separating water from alcohols by pervaporation.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/GB99/03318

2.5 Consequently, the subject-matter of independent claim 1 does not involve an inventive step (Art. 33(3) PCT).

3. The additional features of dependent claims 2-14 are known from D1-D3.

The additional features of dependent claim 15 are known from D6.

For these reasons, dependent claims 2-15 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step.

4. It is further pointed out that the applicant has provided no technical information to show that any subject matter of the application actually solves a problem associated with the membrane structure of the closest prior art (D1, D2). The only comparative tests are carried out against a single tubular membrane (see page 10).

**Re Item VII**

1. Contrary to the requirements of Rule 5.1 (a)(ii) PCT, the relevant background art disclosed in the documents D1-D5 is not mentioned in the description, nor are these documents identified therein.
2. The features of the claims are not provided with reference signs placed in parentheses Rule 6.2 (b) PCT.

**Re Item VIII**

It is not clear from claim 1 whether the internal diameter of 5 to 9 mm relates to the zeolite membranes or to the tubular conduits ("... a zeolite membrane formed on the internal surface of the conduits the zeolite membranes having an internal diameter .."). According to the description (see example), it appears that the internal diameter relates to the conduits (i.e. before coating).